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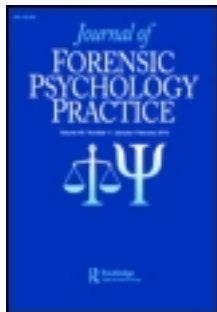
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Social Interaction Related to the Functioning of Forensic Psychiatric Inpatients

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Social Interaction Related to the Functioning of Forensic Psychiatric Inpatients

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The major aim of the treatment of forensic psychiatric patients is to reduce risk of future violence by means of a positive change in the factors associated with the offence. In this article, we argue that information on patients' social network patterns and the content of their relationships provide detailed information about relational behavior that can be an important complement of information on behavior provided by the traditional psycho-diagnostics. We use data on networks of 60 patients in five Terbeschikkingstelling groups and investigate how their relations are associated with three domains of risk-related psychosocial functioning; problem awareness, impulse control, and skills. All three domains were found to be associated with relational patterns, impulse control, and skills showing the strongest associations.

KEYWORDS *forensic psychiatry, social networks, patients' functioning, personality disorder, inpatients*

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INTRODUCTION

In the last decades, the degree to which individual behavior is affected by the social environment has become an important theme in research on criminal behavior (Haynie, 2001, 2002) and on mental and physical health (Kawachi & Berkman, 2001; see Halpern, 2005 for a review). With regard to criminal behavior, researchers became aware not only that relations with others are a resource for achieving all kinds of socially desirable goals but that most criminal acts are not committed by persons alone but by groups of offenders. Indeed, prominent theories for the explanation of criminal behavior are rooted in propositions concerning relationships of offenders (e.g., social control theory argues that criminal acts result from a lack of social integration and deficient bonds to other individuals and to social institutions; Hirschi, 1969), whereas differential association theory (Sutherland & Cressy, 1955; Warr, 2002) posits, in contrast, that delinquent behavior is learned from interactions with others who are delinquent.

The argument that social integration generally affects all kinds of individual behavior and well-being, including mental health, dates back to Durkheim (1858–1917). Next to the classic example of suicide behavior (Durkheim, 1897), modern research found, for example, that small networks and few confidant relationships go together with depressive symptoms (Berkman & Kawachi, 2000; Barnett & Gotlib, 1988).

Given this common acknowledgement of the importance of networks for delinquent and other socially disturbed persons, it is perhaps surprising that there is little knowledge about relationships maintained by imprisoned persons. Examples of research findings are that Lindquist (2000) found that having more social relationships inside prison was associated with higher levels of distress for female inmates, whereas research from Brunt and Hansson (2002) showed positive mental health effects of having an extended social network for persons with severe mental illness in inpatient settings.

Especially for the group of forensic psychiatric patients, a social network perspective might be illuminating, because this is a specific selection of offenders who are disturbed in their relationships and who are institutionalized where they live in groups of others sharing generally the same problems and a common therapeutic treatment. The relational base of their disturbance is illustrated by the description of the disorder of the largest population of forensic psychiatric patients—personality disorders (80%, de Beurs & Barendregt, 2008): “a chronic disturbance in one’s relations with self, others and the environment that results in distress or failure to fulfill social roles and obligations” (American Psychiatric Association, 1994). The characteristics of the disorders and the fact that these patients are incarcerated in fixed groups where also their treatment takes place imply that the course of the treatment and the changes in the patients’ behavior will be closely associated with their patterns of interactions and relationships. So

far, the main tradition in the systematic investigation of interpersonal aspects of personality disorders is based on the interpersonal circumplex research (Kiesler, 1986; Wiggins, 1982) and its extension to a five-factor model (FFM). The factors of this FFM model are neuroticism, extraversion, agreeableness, conscientiousness, and openness. In the circumplex approach, the interpersonal behaviors, traits, and problems of the personality disorders are presented and positioned as a blend of the dimensions, which makes it possible to identify similarities and differences among personality disorders. Evidence for the positioning of personality disorders in this model (Clark, 2007; Mullins-Sweatt & Widiger, 2006; Widiger & Trull, 2007) has supported the importance of interpersonal aspects of personality disorders. However, an important limitation in this line of research is the neglect of the actual interactions between individuals and of the relational patterns in groups of such patients (Haslam, Reichert, & Fiske, 2002).

In this study, information is collected about the relations maintained by each patient with each of the other group members. These relationships of dyadic nature, when considered jointly as a social network, can be studied by techniques of social network analysis (Carrington, Scott, & Wasserman, 2005; Wasserman & Faust, 1994).

Social network analyses can provide information about the group as a whole but also about the network positions of each individual patient in the group. The basic goal of our article is to show that more detailed information on patients' functioning can be gathered through collecting specific information on the different dyadic relationships maintained by a patient in a forensic psychiatric hospital.

Forensic psychiatric hospitals in the Netherlands are obliged to use measures for the risk to reoffend, viz., HKT-30 (Workgroup risk assessment forensic psychiatry, 2002), an instrument especially designed for the Dutch forensic population, and HCR-20 (Webster, Douglas, Eaves, & Hart, 1997), an internationally well-known risk-assessment instrument. The measure of patients' functioning in this study was based on the changeable items of the Dutch risk-assessment instrument HKT-30 (Workgroup risk assessment forensic psychiatry, 2002). A nationwide Dutch retrospective study among 156 released forensic patients by Hildebrand, Hesper, Spreen, & Nijman (2005) showed that those items were associated with violent relapse, indicating patients' risk-related level of functioning.

To provide an exploration and benchmark for the study of networks of forensic psychiatric patients, this article investigates social networks in five groups, each consisting of 12 patients. We discuss how networks of three sorts of relations are related to the dynamic constructs of the HKT-30 concerning patients' functioning.

The remainder of this article is as follows. Previous research into treatment outcomes and current therapeutic treatment is discussed in the next section. This is followed by a section sketching our theoretical framework

and expectations for the associations of social relations and patients' functioning, leading to the formulation of hypotheses. In the succeeding section, measurements and data are described. Finally, results are presented, and the last section concludes and discusses our results.

PREVIOUS RESEARCH ON THERAPY OUTCOMES

The "Terbeschikkingstelling" (TBS) is a Dutch court-ordered treatment measure that can be imposed on any perpetrator of a serious crime who suffers from a mental illness at the moment when the offence was committed. These forensic psychiatric patients are usually treated while being incarcerated in a forensic psychiatric hospital, with the aim to reduce future risk for society. For quite some time, research into therapy outcomes for this group of patients was of a retrospective nature and primarily based on measurements of recidivism. Two studies by van Emmerik (1981, 1984) marked the first research into risk of recidivism. In follow-up research (van Emmerik, 1985, 1989; Leuw, 1995, 1999; Wartna, Harbachi, & Knaap, 2005), several cohorts were monitored of patients who had been institutionalized in forensic hospitals in the Netherlands within the last 5 years. Although these studies provided valuable insights into the degree to which patients reoffended, in particular the type and severity of re-offences and the characteristics of patients doing so, none of these aspects could be related to the therapy and the therapeutic progress during the time of imprisonment, mainly because of the time lag between therapy and offence. Recent research into therapeutic outcomes focuses on the extent to which specific therapeutic aims are met, such as a decrease in certain psychiatric symptoms (e.g., Caldwell, McCormick, Umstead, & Rybroek, 2007; Greeven & de Ruiter, 2004). However, for the outcomes specifically related to treatment of the group of forensic psychiatric patients, the risk of offending is the most important criterion, for which reliable prospective assessment is also most difficult (de Beurs & Barendregt, 2008). Incidents over the past few years, in which current or former forensic psychiatric patients seriously reoffended, led to a Parliamentary enquiry. This enquiry concluded, among others, that risk assessment must be further developed and that research into factors related to risk assessment must be more differentiated and specified and ultimately have to be relevant for treatment (Final report research TBS of parliament enquiry, 2006).

CURRENT THERAPEUTIC TREATMENT

For the last decade, the focus of treatment of forensic psychiatric patients in the Netherlands has changed dramatically from a psychoanalytic and

client-centered approach with an emphasis on personality to a cognitive-behavioral approach emphasizing risk reduction and managing risk factors (Nieuwenhuizen, 2005). The cognitive-behavioral approach assumes that cognitive, emotive, and behavioral patterns of individuals are interrelated and constitute interdependent aspects of a person's adjustment. Cognition is assumed to be most important for an individuals' mood, intentions, and actions. Furthermore, the therapy assesses an individual's short-term and long-term goals within the given social context. The behavior of the individual is assumed to be directed at obtaining these goals (Cohen, 1985).

The following is a very brief sketch of how the therapy given to these patients is based on the cognitive-behavioral approach. The problems of patients with personality disorder manifest themselves in the individual's character and temperament. With regard to an individual's character, this persons' beliefs, view of the world, the future, and self are affected (Sperry, 1999). Temperament refers to the innate, genetic, and constitutional influences of personality; impulsivity and aggression are important elements of temperament for this group (Costello, 1996). Treatment of personality disorders requires the modification of character and the modulation of patients' temperament. Both clinical experience (Freeman & Davidson, 1997) and research (Linehan, 1993) suggests that modulation of temperament must initiate the ultimate modification of character. However, a lot of patients with personality disorder lack mastery of the basic requisite skills (Stanley, Bundy, & Beberman, 2001) for overcoming the deregulations of temperament, often resulting in stress or even violent behavior. Treatment is therefore initially directed at learning of the requisite personal and relational skills and modulating or regulating deregulated temperament. This has the aim to increase patients' readiness and availability to engage in subsequent therapeutic change directed at character dimensions of the disorder.

CONCEPTUAL FRAMEWORK

Approach

The research site is described later; important here is that inpatients are housed in units of about 12 persons and spend most of their time within these units. The patients thus depend on a small group of others for all kinds of daily interactions, and their behavior is constantly monitored by staff members. It has been argued by Sijuwade (2007) that, next to universal reasons for maintaining relationships with others, inmates/patients in closed institutions form interactions with the purposes of (1) combating the dehumanising and degrading environment, (2) defining norms and roles so that expectations are clear, and (3) minimizing risk of assault. Here we inquire into the degree to which the patients develop *positive relationships* with other patients, to what extent they are *influencing one another*, and to

which degree they have *instrumental* relations; and what the network patterns of these relations are within the institutional groups. These three types of relations are defined as follows: “*Positive*” relations are friendly relations and friendships; *influence relations* are relations that lead to changes in other’s attitudes and behavior; and *instrumental relations* are relationships mainly important for material or relational profit and less for the intrinsic value of the relation itself.

We study the association between these relationships with three domains of functioning—problem awareness, impulse control, and skills—the latter being composed of general life skills, social skills, and coping skills. These three domains represent basic elements of the cognitive-behavioral approach to treatment, described earlier. They are considered to be distinct and of major importance in rating patients’ functioning and hence their therapeutic progress; they are also crucial for assessing the risk of patients’ recidivism. The choice for these three constructs was supported by a principal component analysis of the risk assessment items (see Appendix).

Expectations

We expect that the type and pattern of personal networks in which a patient is embedded provides detailed knowledge about that patient’s adjustment that can complement the usual determination of patients’ functioning. As a first step in assessing the validity and interpretability of the social network measures, this article investigates the associations between the social relations and the patient’s functioning.

Problem awareness reflects the cognitions of a patient about his or her personal problems and how these affect his or her social surroundings. If a patient admits having severe psychopathological problems that caused serious offences, she or he is expected to be more inclined to work on these problems and to adjust more favorably in line with therapeutic goals. Hence, we expect that patients with more problem awareness will tend to relate to one another and will therefore maintain *more mutual positive relations with each other* (H1). Besides, they are better motivated and show more empathy toward others; we expect them therefore to maintain *more positive relationships* toward other patients (H2) and *fewer instrumental relationships* toward other patients (H3). Furthermore, patients with more problem awareness and better treatment motivation are less suitable victims for instrumental use by others, so it is expected that they will *be less instrumentally used* by other patients (H4). Problem awareness is not assumed to be directly related to influence relations between patients.

Impulse control of patients reflects the degree of unpredictable and inconsiderate behavior and a disposition toward anger. Patients lacking impulse control have no consideration of the consequences of their

behavior. For patients with low impulse control, uncontrolled impulses often result in rage and anger. They more frequently attribute hostile intentions toward others. Therefore, *fewer positive relationships* are expected, incoming (H5) as well as outgoing (H6). Besides, patients with low impulse control are expected to *instrumentally use more* other patients (H7) because they do not take into account negative consequences of behavior and the possibly resulting damage for the relationship. Besides, their impulsivity and hostile worldview lead to the vulnerability of associating with patients whom they should rather avoid in view of treatment objectives. Also, they can more easily be convinced by others to do things they rather should not do. Therefore, it is expected that patients with less impulse control will be *more instrumentally used* (H8). Besides, it is expected that because of unpredictable and violent acting-out behavior of patients with less impulse control, *more* other patients are *influenced* by them (H9). At the same time, they are themselves vulnerable for *the influence of more* other patients in general (H10).

Skills of a patient are related to a diversity of human abilities, such as self-management skills, skills to maintain relations in a satisfying way, and the ability to adequately cope with problems and stress. Patients with more skills can better take care of themselves and know better how to maintain social relations in a proper way. Therefore, it is expected that patients with better skills maintain *more positive relationships* toward other patients (H11). Because these patients are less dependent on others and more attractive for social contact, it is also expected that other patients maintain *more positive relationships* toward them (H12). Because of the better abilities of patients with more skills to maintain relations in an appropriate way, they will have *fewer instrumental relationships* with other patients (H13). Also, skills result in the ability to take better care of themselves and decrease vulnerability, so it is expected that patients with more skills have *fewer incoming instrumental relationships* (H14). Skills increase the patient's possibilities and the value a patient can have for other patients. This provides abilities for the patient to occupy a good position in the social hierarchy within the group. It is therefore expected that a patient with more skills will have *more influence relationships* toward other patients (H15) and *fewer incoming influence relationships* him- or herself (H16).

METHOD

Research Site

The site of the research is one of the 12 forensic psychiatric hospitals in the Netherlands. This hospital provides residential treatment for about

200 forensic psychiatric patients. The therapeutic treatment is based mainly on cognitive-behavioral therapy and skills training. Patients' disorders can roughly be divided into personality disorders and psychotic disorders. These two groups of patients live in distinct patient units. Each patient unit houses about 12 patients. These are supervised by 8 to 12 socio-therapists working in two shifts during the day with about three therapists per shift. From 8.45 AM to 8.30 PM, patients are locked out of their personal residences and mainly are confined to the patient units. Besides fulfilling therapy-related obligations or joining organized activities elsewhere in the hospital, patients spend their time on the public parts of the unit together with fellow patients and therapists. Meals and drinks such as coffee and tea are largely consumed together, and patients can jointly play games and watch television.

Design

For the data collection, all five treatment units for patients with personality disorders in the forensic psychiatric hospital were used. These are a unit of patients with narcissistic personality, a unit of patients with borderline personality syndrome, a unit of patients with autistic disorder, a unit of patients with co-morbidity of personality disorder and substance abuse, and a unit of sexual delinquents. The patients of the last-mentioned unit are grouped based on the type of offence and suffer from varied personality disorders.

All socio-therapists working on the patient units were asked to evaluate the three distinct types of social relations between the patients on the unit (considered a closed network) by a questionnaire specifically designed for this purpose. For every unit, a laptop computer was prepared with the questionnaire applicable to the specific patient and therapist group in that unit. In this questionnaire, all socio-therapists working on the unit had to evaluate all possible dyadic relations between patients for all three relations.

For collecting information on patients' functioning, a written questionnaire was provided to socio-therapists who mentor patients and besides to the treatment coordinator (psychologist/ psychiatrist) responsible for the unit. The questionnaire was based on presumed changeable risk assessment items (as described under Measurements). Every mentor evaluated a questionnaire for every patient mentored by him or her. The unit treatment coordinators were asked to fill in the questionnaires for all patients in their unit.

The main reason for collecting information on patients' relationships from therapists, and not from patients themselves, was that patients could not be trusted to give valid and reliable responses. This can be suspected given their relational disturbances, manipulative behavioral tendencies, and

mental disturbances. An additional reason is that by using the same respondents for all patients in a given group, response bias will be minimized for within-group comparisons. Ratings by third parties have been considered as a landmark method more generally in the study of mental health (Brown & Harris, 1978).

Measurements

SOCIAL RELATIONS

The three social relationships were described to the respondents as follows:

- (1) Positive relations: the maintenance of friendly and friendship relations with another patient
- (2) Instrumental relation: the use of a relation in favor of one's own advantage concerning material things (like cigarettes, drug, money) and/or concerning the relation itself (e.g., for protection, prestige, sexual favors)
- (3) Influence: relation leading to changes in thinking and/or behavior of another patient

MEASUREMENT OF PATIENTS' FUNCTIONING

Patients' functioning was measured by a total of 29 questionnaire items, based on the dynamic items included in the HKT-30³ (Working group risk assessment forensic psychiatry, 2002), a Dutch professional guideline designed for the assessment of risk of future violence for TBS-ordered patients. Three of these items consisted of original dynamic (i.e., time-changing items of the HKT-30). These were (1) self-management, (2) responsibility for offence, and (3) coping skills. They were measured by five pre-described categories numbered from 0 to 4, in which 0 describes a non-problematic situation related to the measured construct, mounting to 4 representing the most severe problematic situation related to the construct. The other 26 items were scale items based on the rest of the HKT factors included in the research. Those scales (based on the definition of the factor) plus translated items from the Atascadero Skills Profile (Vess, 2001)—a questionnaire to measure patients' skills—were used to more sensitively measure the dynamic HKT-30 items. The items are formulated as statements and have to be evaluated on five-point scales, from 0 to 4. The value of 0 represents that the real situation of the patient is in total opposite of the statement, and 4 represents full correspondence between the statement and the patients'

³ The four dynamic HKT items that apply only to a subset of the patients (psychotic symptoms, substance abuse, acculturation problems and sexual preoccupation) were excluded.

situation. The middle score of 2 is “neutral.” Subscales were constructed based on information from a pilot study and all showed good reliability (Cronbach’s $\alpha = .85$ or higher). For more information and an overview of the items and scale reliabilities, see Appendix.

Analysis

PATIENTS’ FUNCTIONING: FACTOR ANALYSIS

For the calculation of patients’ functioning, all items were coded in a way such that higher scores pointed to better functioning. To distinguish different aspects of patients functioning, a principal component factor analysis was conducted on all items of the questionnaire. A Varimax (orthogonal) rotation specified a three-factor solution that accounted for 65% of the variance. The three factors found could be interpreted as problem awareness, skills, and impulse control (see Appendix), which is in line with theory. The factor “problem awareness” consists of the items about insight in problems, empathy, and responsibility for the offence. The factor “skills” is composed of items related to social skills, self-management, and coping skills. Finally, “impulse control” consists of items related to impulsivity and hostility.

ASSOCIATION BETWEEN SOCIAL RELATIONS AND PATIENTS’ FUNCTIONING: NETWORK ANALYSIS

Functioning variables are defined at the level of individuals, whereas social relations are defined at the level of pair’s individuals, the “dyadic level” that is concerned with inter-individual ties. This raises two methodological issues for the study of associations between functioning and social relations: First, this is an association between variables defined at different levels; second, the independence assumptions that underlie usual statistical methods are not plausible for dyadic variables and may even be regarded as being anti-thetical to our understanding of social relations. The first issue was already dealt with by the way in which the hypotheses were formulated. Each of Hypotheses 2 to 16 deals either with the number of incoming ties toward an individual or the number of outgoing ties from an individual, which is a formulation that has transformed the relations from the dyadic to the individual level. The number of outgoing ties is called the *out-degree*, and the number of incoming ties is called the *in-degree*. Hypothesis 1, conversely, is about pairs of individuals with a similar level of problem awareness and thereby has transformed the individual level to the dyadic level. The second issue is dealt with by the use of statistical methods that have recently been developed specifically for studying dyadic relations, bundled into a network, as dependent variables.

Specifically, the models used are so-called exponential random graph models, abbreviated to ERG models or ERGMs (see Robins, Pattison, Kalish, & Lusher, 2007a; Robins, Snijders, Wang, Handcock, & Pattison, 2007b). These models have as dependent variables the tie variables, indicating whether there is a tie from one individual to another individual, for all pairs of individuals in the group. The tie variables are binary variables defined for pairs of individuals (i, j) , with the value 1 if there is a tie from i to j and 0 if there is no such tie. ERG models represent the dependence between the tie variables in the network and thus can be regarded as variants of logistic regression that are adapted to the dependencies generated by the tie variables being structured in a network. The analysis was done using the software SIENA version 3.2 (Snijders, Steglich, Schweinberger, & Huisman, 2008). This article is not the place for an extensive explanation of the model; the specifications presented further are intended to give an intuitive explanation, together with some information enabling those who already have a grasp of these methods to know how the analysis was carried out. Further explanations about ERG models can be found in the mentioned literature.

The data set comprises five networks each of 12 individuals. Since each individual potentially can have ties to the 11 other members of the group, the total number of tie variables is $5 \times 12 \times 11 = 660$. Each group by itself is too small for a reliable analysis by an ERG model; therefore, the groups are combined in one analysis in such a way that ties are possible only between members of the same group and that parameters of the model are assumed to be the same for all five groups. This is achieved using structural zeros (see Snijders et al., 2008). The assumption of common parameter values in the five groups is made because the total number of parameters in the model should not be too high in view of statistical power considerations. This procedure is reasonable here because the parameters are expected to have the same signs (positive, negative) in the five groups, and although there might be differences between the groups in the “real” values of the parameters, with these relatively small groups these differences are not expected to be significant.

The model specification consists of a so-called structural part representing network dependencies between tie variables and a part representing the effects of the variables specified in Hypotheses H1 to H16. The total number of ties with each group are conditioned. Therefore no separate parameters for the total number of ties per network are needed. The so-called Markov specification (see Robins et al., 2007a) appeared to be adequate to model the network dependencies. This is a specification of network dependencies composed of five components:

Reciprocity: tendency to reciprocation of ties

Transitive triplets: represents tendencies towards transitivity (i.e., when for three actors i , j , and k it holds that i chooses j and j chooses k , there

is a higher tendency for i also to choose k —this can represent clustering of the network into smaller loosely structured subgroups, and it also can represent hierarchy in the network.

Out two-stars: represents dispersion of number of outgoing ties of individuals (variance of out-degrees)

In two-stars: represents dispersion of number of incoming ties of individuals (variance of in-degrees)

Two-paths: represents association of out-degrees and in-degrees

For example, a positive parameter for out two-stars means that the out-degrees are more dispersed (i.e., have a higher variance) than would be expected for a network generated according to the other parameters and with a zero out two-stars parameter. Similarly, for example, a negative two-paths parameters means that the correlation between in-degrees and out-degrees is lower (i.e., less positive, or more negative) than would be expected on the basis of the other parameters included in the model.

For each individual-based functioning variable, as specified in the hypotheses, three effects can potentially be estimated: the out-ties effect, reflecting that an individual with high values of the variable will tend to have more outgoing ties; the in-ties effect, reflecting that an individual with high values of the variable will tend to have more extra incoming ties; and the similarity effect, reflecting that two individuals with similar values of the variable will have a higher probability to be tied. Which of these effects is included in the model follows from the tested hypotheses.

RESULTS

In the model presented next, only those effects are included that are postulated on the basis of prior considerations (H1–H16), together with the five aforementioned structural effects. This is because the amount of data is limited, and the three individual-level variables—problem awareness, impulse control, and skills—are correlated, so that to have a reasonable statistical power, the number of parameters must be as small as possible.

Table 1 presents the results of the analysis of positive ties. There are strong tendencies toward reciprocity and transitivity; the degree distribution is such that there is a tendency toward strong differences in out-degrees (positive out two-stars parameter) but not in in-degrees (non-significant in two-stars), and those with high out-degrees tend to have low in-degrees (negative two-paths). Those with higher social skills receive more incoming positive ties. The other variables do not have significant effects.

Table 2 presents the results of the analysis of instrumental ties. There are strong tendencies towards reciprocity and transitivity; the only systematic tendency of the degree distribution is a weakly significant tendency against

TABLE 1 Positive Relation

Effect	par. est.	s.e.
Reciprocity	2.70***	0.39
Transitive triplets	0.24***	0.05
Out two-stars	0.30***	0.07
In two-stars	0.07	0.10
Two-paths	−0.33***	0.06
Problem awareness similarity (H1)	0.04	0.33
Problem awareness out-ties (H2)	0.77*	0.49
Impulse control out-ties (H5)	0.20	0.38
Impulse control in-ties (H6)	−0.88	0.55
Skills out-ties (H11)	−0.48	0.58
Skills in-ties (H12)	2.04**	0.87

Note. Parameter estimates and standard errors of ERGM analysis of the positive relation network.
* $p < .10$; ** $p < .05$; *** $p < .01$ (two-sided).

TABLE 2 Instrumental Relation

Effect	par. est.	s.e.
Reciprocity	1.83***	0.50
Transitive triplets	0.40**	0.16
Out two-stars	0.05	0.15
In two-stars	−0.62*	0.32
Two-paths	0.05	0.17
Problem awareness out-ties (H3)	0.59	1.06
Problem awareness in-ties (H4)	−2.22	1.57
Impulse control out-ties (H7)	−1.85**	0.98
Impulse control in-ties (H8)	−1.65	1.30
Skills out-ties (H13)	−1.51	1.45
Skills in-ties (H14)	5.83***	2.24

Note. Parameter estimates and standard errors of ERGM analysis of the instrumental relation network.
* $p < .10$; ** $p < .05$; *** $p < .01$ (two-sided).

dispersion of in-degrees (weakly significant negative in two-stars parameter). In other words, incoming instrumental ties have a slight tendency to being equally distributed among patients. Those with higher social skills receive more incoming instrumental ties; those with higher impulse control send fewer instrumental ties. The other variables do not have significant effects.

Table 3 presents the results of the analysis of influence ties. There is a strong tendency toward reciprocity but not toward transitivity; the degree distribution is such that there are tendencies toward strong differences in out-degrees (positive out two-stars parameter) and in-degrees (positive in two-stars), and those with high out-degrees tend to have low in-degrees (negative two-paths).

TABLE 3 Influence Relation

Effect	par. est.	s.e.
Reciprocity	1.91**	0.45
Transitive triplets	-0.06	0.10
Out two-stars	0.54**	0.05
In two-stars	0.33*	0.11
Two-paths	-0.18*	0.07
Impulse control out-ties (H9)	-1.12**	0.42
Impulse control in-ties (H10)	-1.77*	0.79
Skills out-ties (H15)	1.68**	0.59
Skills in-ties (H16)	0.14	1.04

Note. Parameter estimates and standard errors of ERGM analysis of the influence relation network.

* $p < .10$; ** $p < .05$; *** $p < .01$ (two-sided).

This degree distribution is suggestive of a status hierarchy, wherein those with high out-degrees are at the top of the status ladder and those with high in-degrees are at the bottom. Individuals with more social skills send more influence ties. Those higher in impulse control receive and send fewer influence ties.

For all three domains of patients' functioning (i.e., problem awareness, impulse control, and skills), we found clear associations with social relations. These were strongest for impulse control and skills. Specifically, results are as follows. For the hypotheses about problem awareness, we found that patients with more problem awareness showed more outgoing positive relationships with other patients (H2). Hypotheses H1, H3, and H4, stating that patients with similar problem awareness will entertain more mutual positive relations, and patients with better problem awareness will have fewer incoming and outgoing instrumental relationships, were not confirmed. Hypotheses related to impulse control were confirmed incompletely. Patients with less impulse control maintained more outgoing instrumental relations (H7) and were influenced by more patients (H10). Besides, patients with less impulse control were themselves influential toward more other patients (H9). Hypotheses H5, H6, H8, concerning negative associations of impulse control with positive incoming and outgoing relations and concerning a negative association between impulse control and instrumental use by others, were not confirmed.

Skills of patients turned out to be related to all considered relations, and again the hypotheses were confirmed incompletely. Patients with better skills receive more incoming positive relationships (H12) and are instrumentally used by more other patients (H14). Furthermore, better skilled patients showed more influence relationships toward other patients (H15). This amounts to confirmation of Hypotheses H12 and H15. For Hypothesis H14, however, the result was opposite to the hypothesized negative association

between skills and instrumental use by others. Thus we may conclude that this hypothesis was rejected. Hypotheses H11, H13 and H16, concerning associations between skills on one hand and positive relations and instrumental use toward other patients, and incoming influence relationships from other patients, were not confirmed.

CONCLUSIONS AND DISCUSSION

This study provides novel insights into the association between patients' behavior and personal networks of patients with personality disorders who have committed serious violent offences. The empirical research was concerned with the association between social relations and patients' functioning of five groups of in-patients subject to the Terbeschikkingstelling (TBS) measure in the Dutch legal system. TBS patients consist of offenders of serious crimes for which they cannot be held fully responsible, because of severe psychopathology. Because of their large risk to reoffend, the forensic psychiatric patients are subjected to therapeutic treatment within a closed forensic psychiatric hospital, with the aim of reducing future risk for society.

The dominant therapy for the group of patients with personality disorders focuses on the problems in patients' character, temperament, and skills. In line with this, patients' functioning is measured by variables representing three constructs labeled as problem awareness, impulse control, and skills. This distinction between three constructs was empirically confirmed in this study using principal component analysis.

The association between three kinds of social relations—positive relations, instrumental relations, and influential relations—on one hand and the three constructs of patients' functioning on the other hand was analyzed by means of exponential random graph modeling. All three constructs of patients' functioning showed associations with social relations, although not all hypotheses were confirmed. Results indicate that more positive relations were maintained with patients who have better basic requisite life, social, and coping skills. A patient with more of these skills is more socially equipped; therefore, it is not surprising that other patients approach such persons more positively. Better skilled patients were also more instrumentally used by other patients. The opposite was expected, as patients with more skills were expected to be better able to defend themselves against being used for the purposes of other patients. The reason may be that skills make a patient more attractive for instrumental use, because there is more to gain from using a skilled person; such a tie could be interpreted as social capital. Perhaps a patient does not feel a strong urge to defend him- or herself against being instrumentally used. Further, results showed a higher number of influence relationships for better skilled patients. The social skills seem to imply the possibility to influence others.

Impulse control of patients turned out to be related only to patients' instrumental relations and influence, not to positive relations. Patients with better impulse control maintained fewer instrumental relations, influenced fewer other patients, and were themselves influenced by fewer other patients. Patients with better impulse control will better consider the consequences of their behavior. Therefore, they may be less inclined to instrumentally use other patients, as this could harm valuable relationships or treatment objectives. Because of their lower degree of impulsive behavior and less hostile world view, patients with more impulse control will be more predictable in their behavior and will therefore be less of a negative influence on other patients.

Patients' problem awareness turned out to be associated only with positive relations. Patients with better problem awareness maintained more positive relations toward other patients. When patients realize that they have a mental disorder and take responsibility for the crime they did commit, they are likely to have a more positive attitude toward treatment. Therefore, they may be more willing to put effort into therapeutic aims and may show less problematic behavior. This can be reflected in the amount of positive relations.

Associations between social relations and patients' functioning were found most and strongest in the domains of skills and impulse control and least in the domain of problem awareness. This may be considered natural as both social skills and impulse control are domains that reflect the relational part of patients' functioning. Problem awareness is a domain that refers more strongly to the private cognitions and the character of a patient. Cognitive therapy often starts with skills training to neutralize a possible skills deficit of a patient that might activate the temperament and lack of impulse control of a patient. The regulation of temperament should ultimately lead to the possibility to engage in therapeutically change directed at the character dimensions of the disorder.

The results of this research gave a first insight into the association between relational networks between this category of patients and functioning variables reflecting their basic problem domains. This demonstrated for the first time that there is a clear association between mental health and networks of imprisoned patients. The association was strongest for functioning constructs of skills and impulse control, which are the most important domains for direct therapeutic interventions. Because the treatment takes place in closed groups dominated by the network of relations in which the patients take part, we hope and expect that insight in these associations will be fruitful for treatment improvement and for obtaining better predictions for the risk of re-offence.

Our research in the near future will be of a longitudinal nature, focusing on the network dynamics of these patients and the development of their functioning over time. This kind of study can give insight into the association

of treatment progress and possible changes in social intercourse over time and the causality of these associations. In particular, it will be interesting to study how the functioning of relational partners interacts in the progression of their treatment. Such interactions were not studied in the current cross-sectional study because their interpretation is unclear in the absence of longitudinal information.

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APPENDIX: OVERVIEW OF ITEMS, CROHNBACS α FOR SCALES,
AND RESULTS OF THE PRINCIPAL COMPONENT ANALYSIS WITH
VARIMAX ROTATION FOR PATIENTS' FUNCTIONING

Factor	1	2	3
Name	Problem awareness	Skills	Impulse control
Eigenvalue	12.47	3.41	2.93
% of variance explained	43.0	11.8	10.1
Construct/items Cronbachs α	Factor loadings		
Insight in problems (Cronbachs $\alpha = 0.85$)			
1. <i>Insight in own mental processes</i>	.64	.57	-.02
2. <i>Insight in association mental processes and behavior</i>	.61	.48	-.13
3. <i>Ability to indeed adjust behavior as a result of mental processes</i>	.52	.36	.29
4. <i>Awareness of one's problematic behavior</i>	.83	.03	-.09
5. <i>Awareness of psychiatric symptoms and influence on behavior</i>	.79	.12	.04
Empathy (Cronbachs $\alpha = 0.92$)			
10. <i>Ability to put oneself in another's place</i>	.56	.47	.32
11. <i>Intention to apologize toward others if necessary</i>	.72	.25	.34
12. <i>Justified consideration of interests</i>	.68	.35	.37
13. <i>Intention to sympathize with needs of others</i>	.61	.38	.36
14. <i>Intentions to adjust behavior taking into account opinions and feelings of others</i>	.52	.45	.48
Attitude to treatment (Cronbachs $\alpha = 0.89$)			
24. <i>Cooperation with treatment and participation in therapy</i>	.73	.09	.27
25. <i>Openness towards different insights and contact strategies</i>	.83	.09	.21
26. <i>Acceptance of the issue of rules in the forensic hospital</i>	.65	-.17	.52
Responsibility for the offence (HKT item)	.57	.43	.14
Social relational skills (Cronbachs $\alpha = 0.85$)			
19. <i>Ability to maintain contact with others in an acceptable and adequate way</i>	.26	.64	.40
20. <i>Availability of adequate communicative skills</i>	.16	.76	.25
21. <i>Knowledge about when contact is provocating, offending, or positive</i>	.17	.69	-.08
22. <i>Assertiveness</i>	-.10	.69	.07
23. <i>Elementary verbal and non-verbal skills to manage in daily life</i>	.07	.85	.16
Self management skills (HKT item)	-.13	.61	.37
Coping skills (HKT item)	.29	.61	.49
Impulsivity (Cronbachs $\alpha = 0.86$)			
6. <i>Unpredictable and inconsiderate behavior</i>	.00	.37	.77
7. <i>Directedness toward immediate satisfaction</i>	.00	.23	.67
8. <i>Lack of consideration of possible consequences of behavior</i>	.23	.48	.63
9. <i>Presence of regularly uncontrolled rage and anger</i>	.00	.26	.81

(Continued)

APPENDIX (*Continued*)

Hostility (Cronbachs $\alpha = 0.90$)			
15. <i>Attribution of hostile motives towards others</i>	.47	-.04	.60
16. <i>Expression of passive aggression</i>	.44	.01	.67
17. <i>Cynicism and irritations</i>	.42	-.11	.75
18. <i>Expression of severe forms of verbal aggression</i>	.26	.11	.78
